LISTING OF THE CLAIMS

Following is a listing of all claims in the present application, which is provided for the Examiner's convenience:

1. (Original) A method for manufacturing micro electro-mechanical systems, comprising:

(a) forming an insulation layer on an upper surface of a semiconductor substrate and patterning the insulation layer;

(b) forming a structure layer on an upper surface of the patterned insulation layer and etching the structure layer;

(c) forming an under bump metal on a predetermined position of an upper surface of the structure layer;

(d) forming a via hole in a glass substrate corresponding to the position of the under bump metal of the structure layer and in a shape such that the via hole is larger in diameter at an upper surface of the glass substrate than at a lower surface of the glass substrate, wherein the glass substrate is bonded to the upper surface of the structure layer and creates a vacuum chamber that protects a structure of the structure layer; and

(e) arranging a solder ball in the via hole and bonding the solder ball to the under bump metal by melting the solder ball.

2. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein in (b), the structure layer is formed using an inductively coupled plasma-reaction ion etching (ICP-RIE).

3. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein in (d), the via hole is formed using one selected from the group consisting of sand blasting, laser ablation and wet etching.

4. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein in (d), the glass substrate is bonded to the upper surface of the structure layer using either anodic bonding or soldering.

5. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein (d) further comprises removing an oxidation layer, which is bonded onto the upper surface of the structure layer.

6. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 5, wherein the oxidation layer is removed either by printing a flux or by melting under an inert gas atmosphere without the flux.

7. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein in (a), the semiconductor substrate is a silicon substrate.

8. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein in (b), the insulation layer is formed of one selected from the group consisting of Cr/Au alloy, Ti/Au alloy and Cr/Ni/Au alloy.

9. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein in (c), the under bump metal is formed of one selected from the group consisting of Cr/Au alloy, Ti/Au alloy, Cr/Ni/Au alloy and Cu/Ni/Au alloy.

10. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 1, wherein in (e), the solder ball is formed of one selected from the group consisting of Sn/Pb alloy, In/Sn alloy, Au/Sn alloy, Ag/Cu alloy, In/Ag alloy, In/Bi alloy, Sn/Bi alloy, Sn/Cu alloy, Ag/Sn alloy, Sn/Ag/Cu alloy, Sn/Ag/Cu/Bi alloy, Sn/Ag/Bi alloy and Sn/Zn alloy.

11. (Original) A method for manufacturing micro electro-mechanical systems, comprising:

(a) forming an insulation layer on an upper surface of a semiconductor substrate and patterning the insulation layer;

(b) forming a structure layer on an upper surface of the insulation layer and etching the structure layer;

(c) forming a via hole in a predetermined position of a glass substrate and in a shape such that the via hole is larger in diameter at an upper portion of the glass substrate than at a lower portion of the glass substrate, wherein the glass substrate is bonded to an upper surface of the structure layer and creates a vacuum chamber that protects a structure of the structure layer;

(d) forming an under bump metal in a bottom of the via hole and forming a via side metal on an inner wall of the via hole; and

(e) disposing a solder ball in the via hole and bonding the solder ball with the under bump metal and the via side metal by melting the solder ball.

12. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein in (b), the structure layer is formed using an inductively coupled plasma-reaction ion etching (ICP-RIE).

13. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein in (c), the via hole is formed using one selected from the group consisting of sand blasting, laser ablation and wet etching.

14. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein in (c), the glass substrate is bonded to the upper surface of the structure layer using either anodic bonding or soldering.

15. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein (d) further comprises removing an oxidation layer, which is bonded onto the upper surface of the structure layer.

16. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 15, wherein the oxidation layer is removed either by printing a flux or by melting under an inert gas atmosphere without the flux.

17. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein in (a), the semiconductor substrate is a silicon substrate.

18. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein in (b), the insulation layer is formed of one selected from the group consisting of Cr/Au alloy, Ti/Au alloy, and Cr/Ni/Au alloy.

19. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein in (d), the under bump metal and the via side metal are formed of one selected from the group consisting of Cr/Au alloy, Ti/Au alloy, Cr/Ni/Au alloy and Cu/Ni/Au alloy.

20. (Original) The method for manufacturing micro electro-mechanical systems as claimed in claim 11, wherein in (e), the solder ball is formed of one selected from the group consisting of Sn/Pb alloy, In/Sn alloy, Au/Sn alloy, Ag/Cu alloy, In/Ag alloy, In/Bi alloy, Sn/Bi alloy, Sn/Cu alloy, Ag/Sn alloy, Sn/Ag/Cu alloy, Sn/Ag/Cu/Bi alloy, Sn/Ag/Bi alloy and Sn/Zn alloy.